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## On embryo implantation

Lambers, M.J.

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## Summary

**Chapter 1** contains the outline of the thesis.

In **chapter 2** we evaluate the accuracy of a single hCG determination to optimise the cut off values of the hCG-levels after embryo transfer. We found that a single serum hCG determination only 14 or 15 days after oocyte retrieval is sufficient for discrimination between viable and non-viable pregnancies. The level of this pregnancy hormone reflects the strength and potential of the implantation and provides patients with some essential perspective in a very early stage of pregnancy.

In **chapter 3** we demonstrated that the continuation of pregnancy is dependent on the combination of genetic and developmental potential of embryos and an optimal uterine milieu, while the occurrence of multiple implantation after DET in IVF is predominantly dependent on embryo quality.

**Chapter 4** demonstrates that even though multiple ovulation has a hereditary basis, it is very unlikely that multiple implantation also has a hereditary basis itself. The findings of this study underline that multiple implantation after DET in IVF is mainly determined by the quality (and therefore potential) of the transferred embryos.

In **chapter 5** we studied the value of monitoring of the embryo transfer by ultrasound in comparison with a transfer technique that positions the catheter based on previous uterine length measurement. Although ultrasonographic monitoring of the transfer provides both patient and doctor with visual feedback of the transfer, it did not help to improve pregnancy rates.

With the visual feedback from the ultrasonographically monitored embryo transfer we demonstrated in **chapter 6** that there is a relation to the location of the transfer air bubble after embryo transfer to the clinical outcome of the IVF treatment. With the air bubbles as markers for the content of the transfer catheter we found that pregnancy rates were higher when the air bubbles ended in the upper half of the thick endometrial plate.

By repeating the ultrasound fifteen minutes after the ultrasonographically monitored embryo transfer we demonstrated in **chapter 7** that the final position of transfer content is not sensitive to immediate ambulation after embryo transfer. Changes in position of the transfer content in both groups of patients (immediate ambulation or bedrest after transfer) were directed in the same direction: towards the fundus.

**Chapter 8** is an analysis of the effect of aspirin on pregnancy rates after IVF and on the Pulsatility Index of the uterine arteries throughout the treatment and first trimester of pregnancy. This prospective double blind placebo controlled randomised trial shows that use of aspirin during IVF treatment does neither influence the pregnancy rates nor the Pulsatility Index of the uterine arteries.

The follow up of the patients who became pregnant in the aspirin study was reported in **chapter 9**. From analysing the further course of their pregnancies we found that the pregnant patients from the aspirin treated group have less hypertensive pregnancy complications such as hypertension, pre-eclampsia and HELLP-syndrome.

**Chapter 10** contains a general discussion of the results in this thesis and suggests future strategies for further research to unravel more of the secrets of embryo implantation.